Description

Sealing Gasket with Magnetic Closure, Particularly for Door Wings, Hatches, Windows and Doors and the Like and Method for its Realisation

Technical Field

The present invention relates to a sealing gasket with magnetic closure.

The invention further relates to a new method for the realisation of a sealing gasket with magnetic closure.

In particular, the subject gasket is destined to realise magnetic closures in uses such as windows and doors, door wings of refrigerating rooms, wings and/or doors for shower compartments, etc., exerting a tighter or less tight seal according to the uses and operative requirements arising on each occasion.

Background Art

As is well known, sealing gaskets or section bars with magnetic closure are formed by a supporting section bar made of plastic resin which normally comprises an attachment base or portion, for instance presenting a "P"-shaped cross section or with tabs, for engagement to a movable part or to a fixed part of a window, of a door and the like, and a rabbet portion, presenting a striking face set to match against a surface with which the closure is obtained.

Internally to the rabbet portion of the section bar is associated a magnetised strip-shaped element, for instance made of plasto-ferrite. In some types of gasket, the magnetised strip-shaped element presents on its main face, corresponding to said striking face of the section bar, at least a pair of magnetised longitudinal bands with opposite polarity on each cross section. In other words, the magnetic element presents for example two adjacent longitudinal bands, one with North polarity and the other one with South polarity. In dual gasket closures, both parts set mutually to match in the closed position are provided with their own magnetic section bar,

obviously presenting said magnetised longitudinal bands with their polarities suitably positioned to realise the mutual attraction force.

In practice, on the main face of the magnetised strip-shaped element, for example, there is a longitudinal band of the same polarity flanked over the entire length of the gasket by a longitudinal band of opposite polarity. In the case of sealing gaskets of greater length, for example around 10 mm, for the best exploitation of the magnetic attraction force, 4-pole magnetised elements, i.e. presenting 4 longitudinal bands, can also be used. In this case, each band presents the same polarity along its entire longitudinal development and is positioned adjacently to a band of opposite polarity, so that transversely each band is alternated with a band of opposite polarity.

The known method for the realisation of the sealing gaskets summarily described above generally comprises the continuous unwinding from a coil of a strip-shaped element already longitudinally magnetised as stated; thereafter, the latter is coated preferably by means of extrusion of a section bar made of plastic resin or the strip-shaped magnetised element is inserted into a plastic resin section bar with an appropriate pre-formed seat; subsequently, the product thus obtained is cooled in tanks, and cut transversely into the required lengths. Possibly, depending on the applications, the rectilinear gaskets are terminally welded to form ready-made sealing frames (one can think, for instance, of uses for refrigerated rooms, windows and doors, et cetera).

The sealing gaskets with magnetic closure of the kind described above present some important drawbacks.

In the first place, directly in the manufacturing phase, it is necessary to guarantee a correct positioning of the magnetic poles on the section bars since any errors may compromise the future suitability for use of the product.

Moreover, particularly in the case of symmetrically shaped magnetic section bars destined to be coupled frontally with identical magnetic section bars, it is necessary suitably to mark the section bars and the magnetised strip-shaped elements by means of small projections or grooves, in order to identify on which side of the

striking face the same polarity is present, to provide correct indications both during the manufacturing process and when mounting the gaskets. It is essential, upon closing two parts of a window or door or the like, for the magnetic poles of each gasket to be positioned in correspondence with magnetic poles of opposing sign belonging to the opposite gasket. These mounting conditions are often not met, which forces the workers assigned to the task to perform laborious operations to remove one of the two magnetic closure gaskets and apply the gasket anew after suitably reversing its position, thereby positioning the magnetic charges correctly.

Also in the case of asymmetrically shaped section bars, typically destined to form angle closures on surfaces for instance inclined by 45° from the respective attachment bases, some negative aspects are encountered. In this type of section bar, though mounting errors are not possible given its particular shape, it is nonetheless necessary to use two different section bars, each having, in its interior, magnetic section bars with opposite poles, and thus realised with two distinct manufacturing processes with obvious increases in terms of manufacturing, handling, and storage.

In addition, with particular reference to the latter type of gasket with asymmetrical cross section structure, it should be noted that in case of a manufacturing error involving an incorrect positioning of the magnetic poles of a gasket, it would not be possible to use that gasket after suitably reversing it since, due to the asymmetry, the reversed gasket would no longer be able correctly to engage the support whereto it is destined.

In the attempt to overcome the latter drawback, gaskets have been proposed on the market which are provided with a magnetic element having an odd number of magnetised longitudinal bands. Should it be possible to use gaskets with an odd number of magnetised longitudinal bands, for instance with three poles, i.e. provided with three magnetised longitudinal bands on the striking face, each longitudinally of the same polarity and of opposite polarity with respect to those flanking it, it would nonetheless be necessary, in case of closures with dual gaskets, to have two distinct magnetic section bars available. A first section bar presents the two side bands of a

given polarity and the central band of opposite polarity whereas, obviously, the second section bar presents the two lateral bands and the central band with polarity opposite to that of the first section bar.

Hence, the drawbacks in terms of manufacturing, handling, etc. are obvious.

Disclosure of Invention

In this situation, the technical task at the base of the present invention is to devise a sealing gasket with magnetic closure and a method for its realisation able substantially to overcome the aforementioned drawbacks.

Within the scope of said technical task, an important aim of the invention is to devise a sealing gasket with magnetic closure force which is of a single type for both parts of a window, door or the like, to be approached in closure irrespective of the cross section shape of the supporting section bar.

Another important aim of the invention is to devise a sealing gasket with magnetic closure that allows to prevent all errors in its mounting.

A further aim of the invention is to devise a method for the realisation of a sealing gasket in accordance with the invention which allows to manufacture additional gaskets in the required lengths without any difficulty.

The stated technical task and the specified aims are substantially attained by a sealing gasket with magnetic closure and by a method for its realisation which are characterised in that they comprise one or more of the technical solutions claimed below.

The description of some preferred, but not exclusive, embodiments of a sealing gasket with magnetic closure according to the invention is provided below, purely by way of non limiting indicative example; the description is made with reference to the accompanying drawings, provided purely by way of example.

Description of the Drawings

- Figure 1 shows a generic cross section of a first embodiment of a sealing gasket for

frontal closures whereto the invention can be applied;

- Figure 2 shows a generic cross section of a second embodiment of a gasket for 45° closures whereto the invention can be applied;

- Figure 3 schematically highlights a front view of two strip-shaped elements magnetised with two poles according to the invention and able mutually to couple in any way, characterised by a pair of segments of opposite polarity in each magnetised longitudinal band;

- Figure 4 shows a schematic front view of a strip-shaped element magnetised with 4 poles and with a pair of segments for each magnetised longitudinal band; and

- Figure 5 shows a schematic front view of a strip-shaped element magnetised with two poles and with two pairs of segments for each magnetised longitudinal band.

Description of the Illustrative Embodiments

With reference to the aforementioned figures, the sealing gasket with magnetic closure according to the invention is indicated in its entirety with the number 1.

It comprises a supporting section bar 2 made of plastic resin, in turn comprising an attachment base 3 and a rabbet portion 4 presenting a striking face 4a set to come to rest against a surface provided for matching therewith which, in closures with dual gaskets, is constituted by the striking face of another gasket.

In the rabbet portion 4 of the supporting section bar 2 is inserted a magnetised strip-shaped element 5 presenting on a main face 5a, corresponding to the striking face 4a, at least a pair of magnetised longitudinal bands 6, 7 of opposite polarity in each cross section. It should be noted that the magnetised longitudinal bands involve part, or preferably, all of the longitudinal extension of the element 5. Obviously, depending on the applications, areas of the surface 5a without magnetisation may be provided.

Originally, each longitudinal magnetised band 6, 7 is subdivided in at least a pair of segments, respectively 6a, 6b and 7a, 7b, preferably of equal length presenting homogeneous magnetic poles in each segment (longitudinally consecutive) and

opposite with respect to those of the other segment of the same longitudinal band. In practice, each segment 6a, 6b or 7a, 7b of each magnetised longitudinal band 6 or 7 is flanked laterally and is adjacent longitudinally to segments of opposite polarity.

For instance, Figure 3 shows two strip-shaped elements destined to be mutually coupled and presenting each a pair of magnetised longitudinal strips 6,7. The strip 6 superiorly presents, as shown in Figure 3, a segment 6a with South polarity and an inferior segment 6b with North polarity. Conversely, the strip 7 presents superiorly a segment 7a with North polarity and inferiorly a segment with South polarity.

It is obviously possible to provide, on the contrary, for the segments 6a and 7b to have North polarity and for the segments 7a and 6b to have South polarity.

Figure 4 shows the main face 5 of a strip-shaped element with two polar pairs, i.e. with four magnetised longitudinal strips 8, 9, 10, 11, each of which is subdivided into a pair of (longitudinally consecutive) segments, preferably of equal length, i.e. 8a and 8b, 9a and 9b, 10a and 10b, 11a and 11b. In this case too one can observe that each segment, for instance with North polarity, is laterally flanked by one or more segments with South polarity and is longitudinally adjacent to a segment, also with South polarity.

Figure 5 shows the main face of a strip-shaped element with one polar pair, i.e. with two longitudinal strips 6, 7, each of which is subdivided into two pairs of segments of equal length respectively indicated as 6a, 6b, 6c, 6d and 7a, 7b, 7c, 7d. Each segment of each strip complies with the alternation in polarity with the segment flanking it and with the longitudinal adjacent segment or segments.

The aforementioned examples are provided purely by way of indication, for it is obviously possible to subdivide each magnetised longitudinal strip into a greater number of pairs of segments of the same length, according to a checkerboard distribution of the alternating polarity.

The strip-shaped elements longitudinally magnetised with the criteria described above can be advantageously coupled to any shape of the supporting section bar.

In particular, in Figure 1 the rabbet portion 4 of the supporting section bar

presents a substantially rectangular cross section shape so as to position the striking face 4a parallel with respect to the attachment base 4 to realise frontal closures. Given its symmetry this supporting section bar, as in the prior art, is a single one for both gaskets of a dual gasket closure, but, advantageously, cannot give rise to mounting errors because, as can be noted observing any one of the Figures 3, 4, 5, the reversal or mutual interchange of the extremities of a gasket does not change the disposition of the magnetic poles. For instance, with reference to Figure 3, if the gasket is reversed around a median transverse axis, the segment 6a with South polarity would be exchanged with the segment 7b, also with South polarity and, obviously, the segment 7a with North polarity would be replaced by the segment 6b, also with North polarity.

In Figure 2 the rabbet portion 4 has a substantially right triangle cross section profile, thereby positioning the striking face 4a inclined to about 45° with respect to the attachment base 3 to enable forming closures between opposite gaskets along matching surfaces oriented to 45°. Also with this shape of the supporting section bar the employment of the magnetised strip-shaped element in the manners described above is particularly advantageous as it is possible to produce a single type of symmetric gasket and then reverse, upon mounting, one of the two gaskets to be coupled in order to realise the right gasket and the left gasket with a simple reversal of position, naturally keeping unchanged the position of the magnetic charges. Hence, the manufacture and storage of two distinct gaskets are avoided with obvious benefits in terms of costs.

The invention realises a new method which also constitutes an integral part of the present patent.

The method provides for continuously unwinding from a coil a strip-shaped element made of material that is capable of being magnetised, but is not yet magnetised (or is only partially magnetised), for instance plasto-ferrite, and for inserting said strip-shaped element in a supporting section bar made of plastic resin, for instance directly during the extrusion of the section bar itself. The method further

provides for identifying each portion of the supporting section bar, fitted internally with the strip-shaped element able to be magnetised, destined to form a gasket, i.e. having the required longitudinal development, and for subdividing said portion into at least a pair of areas of equal length (or similar length). The areas thus identified are subjected to magnetisation on a main face corresponding to the striking face of the supporting section bar along at least a pair of longitudinal faces, each subdivided into segments corresponding to the same areas of equal length (or similar length).

The magnetisation is performed so that each segment 6a, 6b, 7a, 7b, etc. presents its own homogeneous polarity, opposite to that of the segment laterally flanking it and of the longitudinally adjacent segment.

Obviously all gaskets that are to be mutually coupled are subdivided into the same number of pairs of segments of equal length and each segment presents magnetic charges of the same polarity as the segment of the other gasket having corresponding position.

Lastly, each gasket realised is cut. This operation, if desired, can be performed also before the magnetisation process.

The invention presents important advantages.

The possibility of applying the gaskets with symmetrical cross sections in accordance with the invention without having to follow any mounting rule aimed at correctly positioning the magnetic charges makes mounting faster and simpler, preventing all possibilities of installing gaskets which, instead of magnetically attracting each other, are mutually repelled.

It should be noted that even in gaskets with asymmetrical cross section, wherein normally no positioning errors are possible because the very shape of the gasket forces a proper mounting, the use of magnetised strip-shaped elements in accordance with the invention allows to limit the gaskets to be manufactured and stored to one type only.

It is stressed that the condition of positioning indifference of the magnetised strip-shaped element and therefore also of the gasket makes it unnecessary to place

on the surface of the gasket particular markings relating to the position of the magnetic charges (in the examples shown such marking are present though wholly unneeded with reference to the identification of the distribution of the magnetic charges).

Lastly, it should be noted that the method according to the invention is particularly advantageous for the realisation of gaskets of the type described above because, if the prior art method were used, i.e. in particular if a strip-shaped element were to be magnetised beforehand, prior to being wound into the coil, it would be necessary not only to have *a priori* knowledge of the lengths of the gaskets to be manufactured, but also to synchronise with a great deal of precision and with obvious difficulty the cutting of the section bar with its advance, in order to obtain gaskets whose segments are magnetised correctly.